

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Provide a comprehensive overview of reaction intermediates, their stability, and how their detection helps in mechanism determination
17. Explain the aromaticity of annulenes, including the rules for determining aromaticity and their importance in organic chemistry.
18. Describe the reactions involving oxygen and sulfur nucleophiles, highlighting the mechanisms and selectivity in these reactions.
19. Discuss the configurations of complex chiral compounds such as allenes, spiranes and biphenyls.
20. Explain optical rotation and optical rotatory dispersion (ORD), including the principles, factors affecting optical activity, and the interpretation of ORD curves.

NOVEMBER/DECEMBER 2023

**23PCH11 — ORGANIC REACTION
MECHANISM – I**

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Write the Hammond postulate.
2. What is meant by LFER?
3. What is aromaticity in organic chemistry, and how does it differ between benzenoid and nonbenzenoid compounds?
4. What are nitrogen electrophiles? Give any two examples.
5. What are the main factors that influence the reactivity of aromatic nucleophilic substitution reactions?
6. What is the von Richter rearrangement, and how does it occur in organic reactions?
7. Define enantiotopic and diastereotopic faces.



8. Define optical purity. What is its role in asymmetric synthesis?
9. What is conformation, and how does it differ from configuration in organic chemistry?
10. What factors influence the stability of five- and six-membered rings in cyclohexane compounds?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Discuss the non-kinetic methods used in studying reaction mechanisms.

Or

- (b) Explain the significance of cross-over experiments in elucidating reaction mechanisms and provide an example of their application.

12. (a) Discuss the aromaticity of heterocyclic compounds, providing specific examples and their significance in organic chemistry.

Or

- (b) Describe the key principles governing aromatic electrophilic substitution reactions, including the role of electrophiles and the overall mechanism.

13. (a) Explain the S_N1 and S_N2 mechanisms in the context of aliphatic nucleophilic substitution.

Or

- (b) Describe the mechanisms and products of the Bucherer and Rosenmund reactions and their applications.

14. (a) Discuss the concept of optical isomerism in depth, including the role of chiral centers and the differences between enantiomers and diastereomers.

Or

- (b) Explain racemic modifications and the various processes involving racemization, reversible formation, and epimerization.

15. (a) Explain the concept of neighbouring group participation and its impact on reaction mechanisms in acyclic systems.

Or

- (b) Describe the stability of mono- and di-substituted cyclohexanes, including the effects of substituent size and position.

